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(54) Sanitary tampon

(57) A sanitary tampon comprises an applicator having an outer cylinder 25 shaped for insertion into the body and inner cylinder 30 within cylinder 25 and extending to the vicinity of the front end thereof and slidably withdrawable therefrom, the inner cylinder 30 contains an absorbent pad 20 and preferably has at least one longitudinal slot 11 extending from its front end for a distance greater than the length of the pad 20, the slots being slidably engaged with projections 28, 29 on the inside wall of outer cylinder 25 such that each projection extends through the slots and into cylinder 30 to prevent withdrawal of material 20 from cylinder 25 when the inner cylinder 30 is withdrawn.

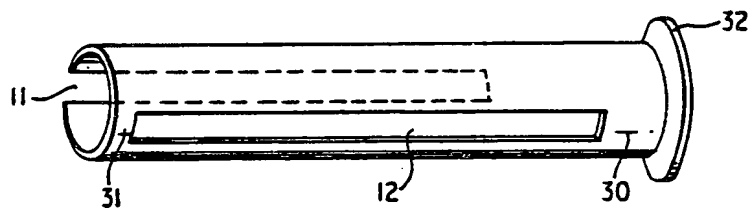


Fig. 10.

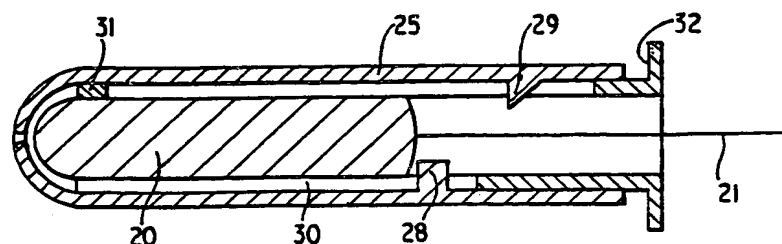


Fig. 12.

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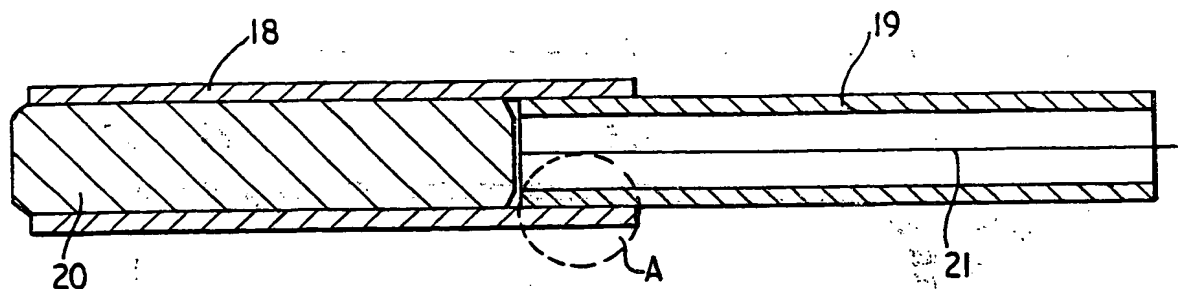


Fig. 1.

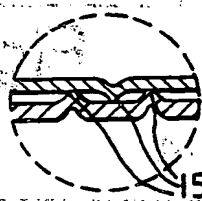


Fig. 2.

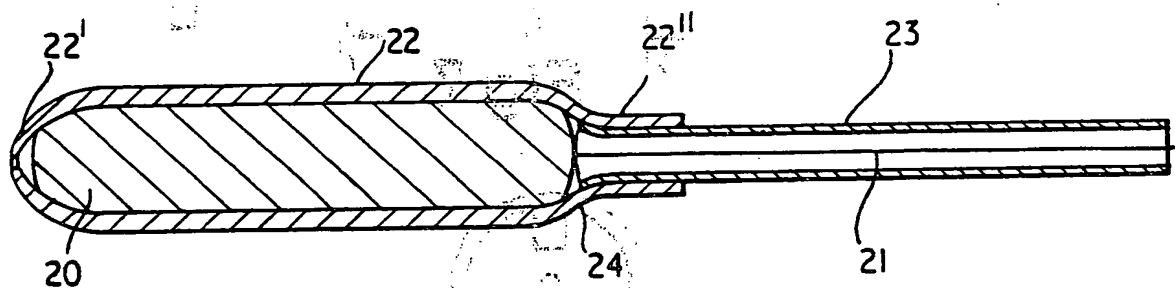


Fig. 3.

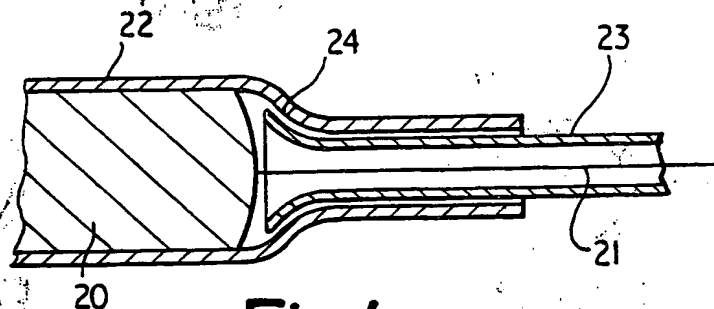


Fig. 4.

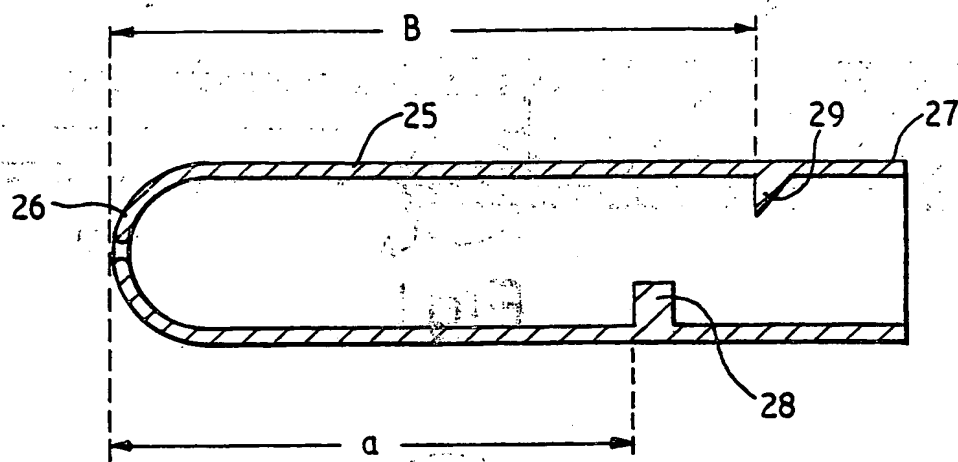


Fig. 5.

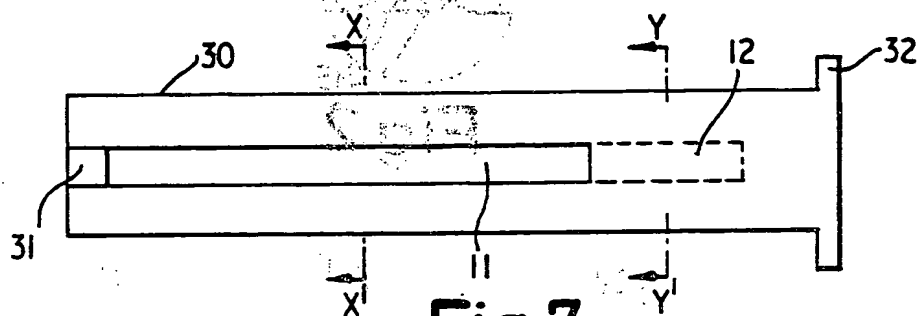


Fig. 7.

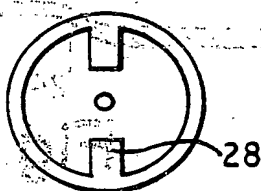


Fig. 6.

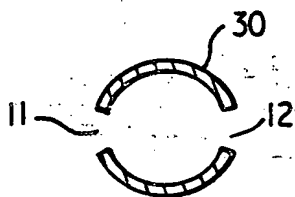


Fig. 8.

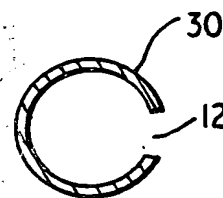


Fig. 9.

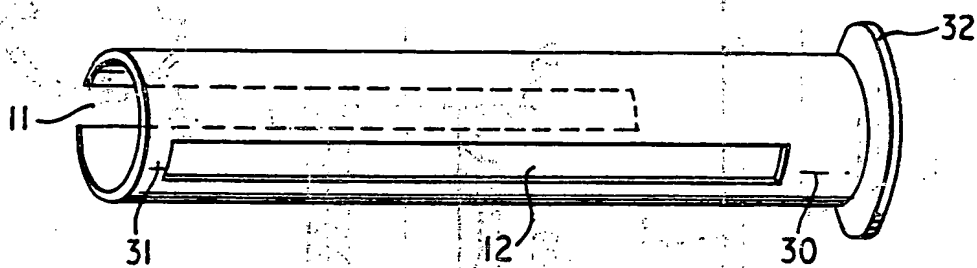


Fig.10.

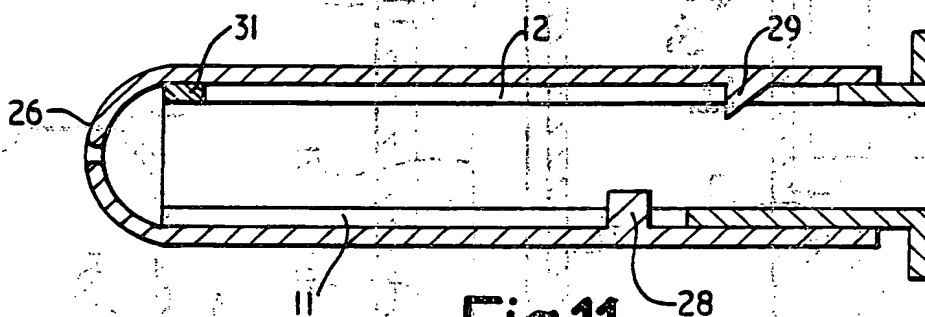


Fig.11.

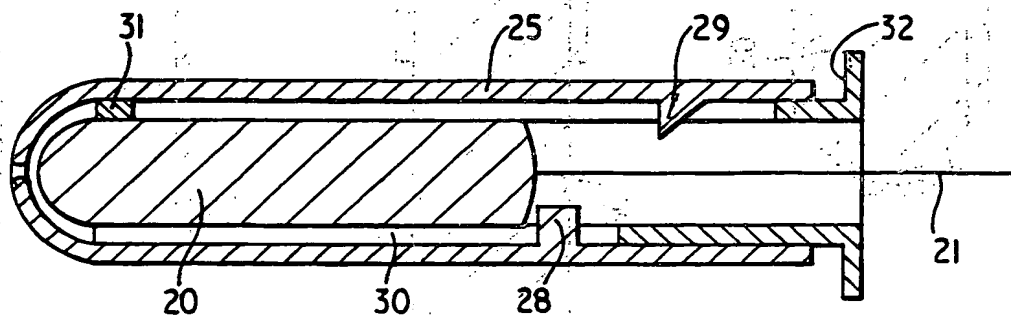
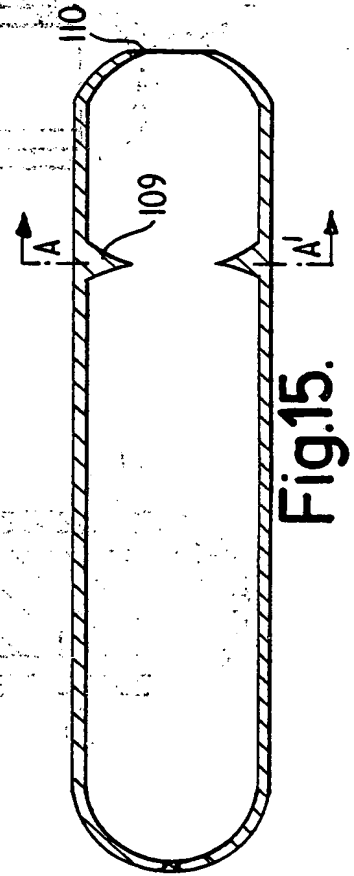
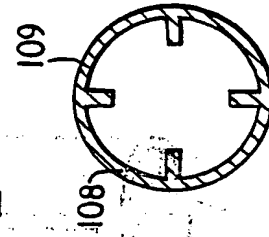
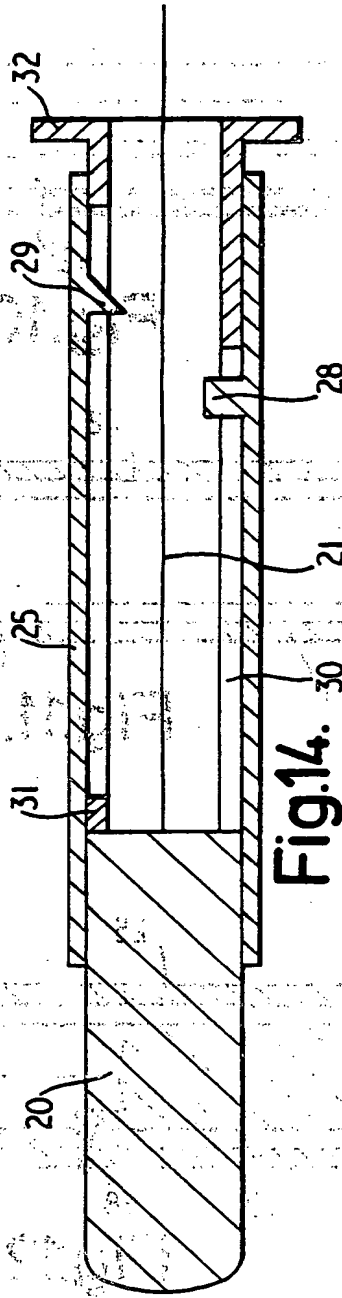
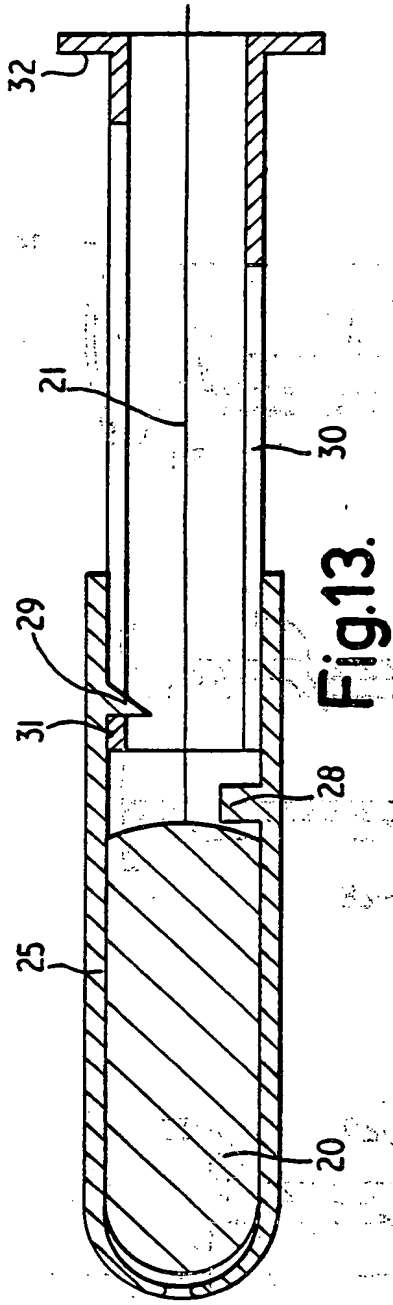


Fig.12.



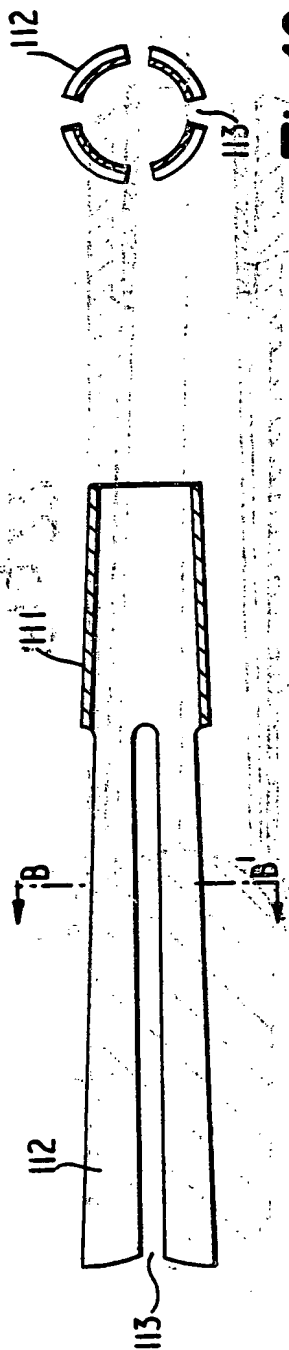


Fig.17.

Fig.18.

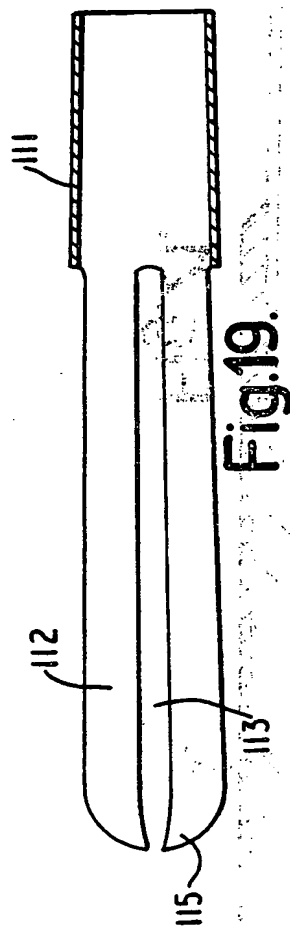


Fig.19.

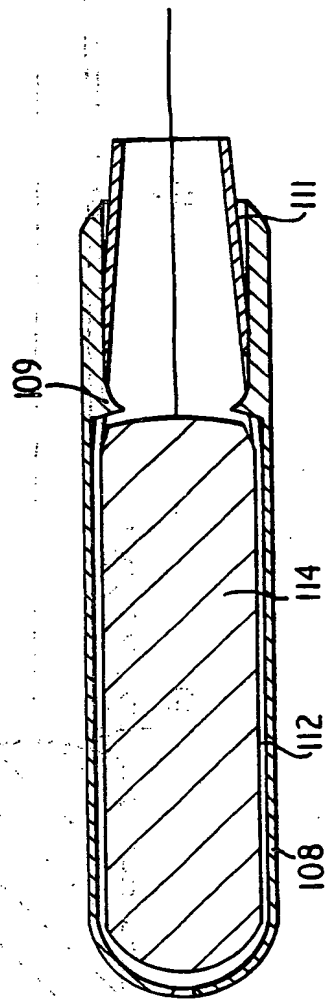


Fig.20.

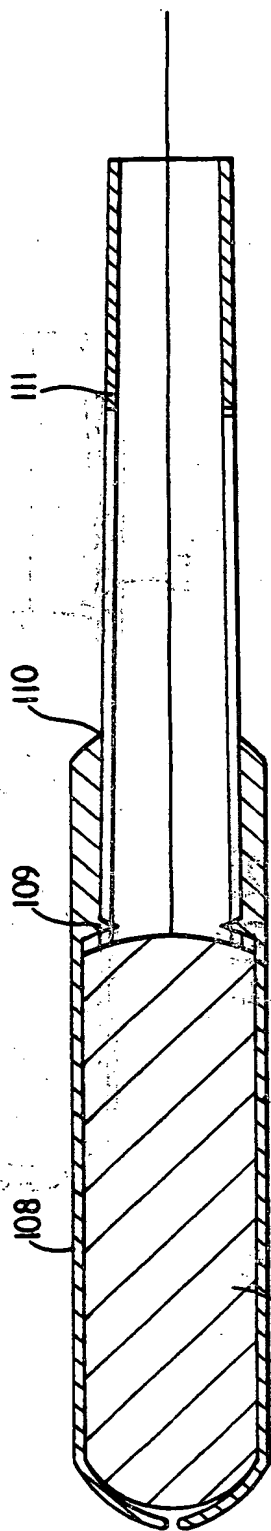


Fig. 21.

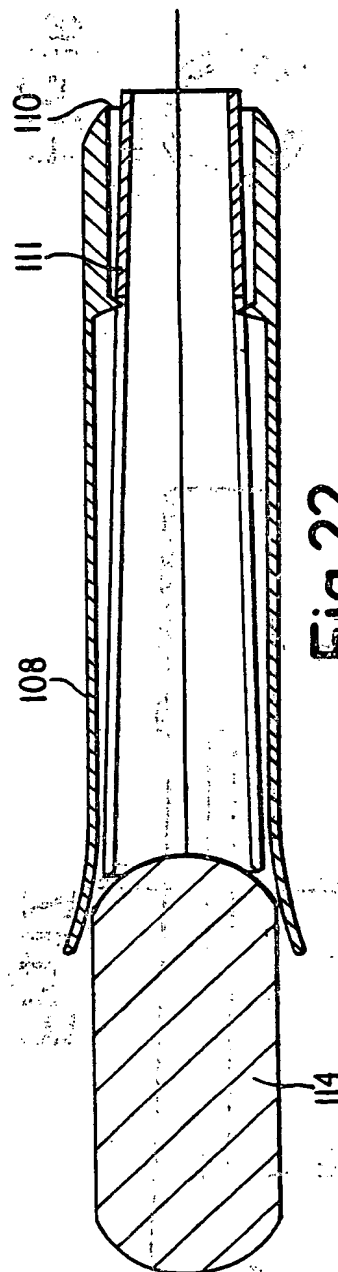


Fig. 22.

SPECIFICATION

Sanitary tampon

5 The present invention relates to a sanitary tampon for menstrual discharges.
Sanitary towels have until now been the most widely used articles for absorbing menstrual discharges, but the demand for tampons has recently been increasing. The following three types of tampons have heretofore been proposed and marketed:

(1) Finger type:
15 Typically, a pad formed by compression-molding of an absorbent material such as an absorbent cotton or the like is used. When a tampon of this type is used, a covering material is first completely removed and then an inner absorbent pad is inserted into the body by the fingers of the user. The main advantage of the tampon of this type is that the size can be diminished. More specifically, a tampon of this type is much smaller than an ordinary sanitary towel and it can easily be carried in a handbag or the like when the user goes out. However, when it is actually used, the absorbent pad is inevitably touched by the hand of the user and it must be inserted by fingers which inevitably touch unsanitary areas before insertion. Therefore, the tampon of this type is not satisfactory from the sanitary point of view.

(2) Stick type:
35 An absorbent pad similar to the absorbent pad of the tampon of the type (1) is used, but a hole is formed in the tail portion of the absorbent pad and one end of a stick-like tool composed of compressed paper or the like is arranged at this hole and the absorbent material is inserted into the body with the aid of this tool. This type is an improvement over the above-mentioned type (1) from the sanitary viewpoint. However, since the stick-like inserting tool is very thin, the operation is not performed stably and the user inevitably feels that the tampon may not be securely inserted.

(3) Applicator type:
50 An inserting tool composed of a paper material, a plastic material or the like, which includes outer and inner cylinders capable of sliding relatively to each other, is employed, and an absorbent material is contained in the outer cylinder and is pushed out through an opening in the top end of the outer cylinder and inserted into the body by sliding the inner cylinder. The sanitary problem involved in the type (1) is solved substantially completely in this type. However, the tampon of this type is defective in that (1) falling-out of the inner cylinder is readily caused by insufficient connection between the inner and outer cylinders and (2) since a special inserting tool as de-

scribed above is employed, the tampon as a whole is very large and at least twice the length of the pad of absorbent material and it is therefore very troublesome to carry the tampon.

The present invention relates to a tampon of the above-mentioned type (3). More particularly, the present invention relates to an improvement in a sanitary tampon for menstrual discharges having a mechanism for inserting an absorbent pad into the body by using an inserting tool. In short, the present invention provides an applicator type tampon in which the foregoing defects involved in the conventional hygienic tampons are substantially eliminated.

Many tampons of the applicator type have heretofore been proposed, and typical instances will now be described in detail by reference to the accompanying drawings.

According to one prior art technique, a tampon including an applicator composed of a paper material has been marketed. In this tampon, an outer cylinder 18 and an inner cylinder 19 are arranged in a manner as shown in Fig. 1, and an absorbent pad 20 is contained in the outer cylinder and a string 21 for taking out the absorbent material extends to the outside of the outer cylinder. When the tampon is actually used, the outer cylinder 18 is inserted into the body and the inner cylinder 19 is slid toward the interior of the body to push out the absorbent pad 20 into the body and complete the insertion. In order to prevent falling-out of the inner cylinder in some tampons, projections 15 are formed by pressing the inner and outer cylinders as shown in an enlarged view of Fig. 2. Even by provision of such projections, however, no satisfactory effect of preventing falling-out of the inner cylinder has been attained. Furthermore, if such projections are formed, the length of the applicator is increased and is more than twice the length of the absorbing material.

Subsequently to tampons including a paper applicator, there have been marketed tampons including a plastic applicator as shown in Fig. 3.

In the known tampon shown in Fig. 3, an outer cylinder 22 has a petal-like hemispherical projecting end 22' shaped to surrounding an absorbent pad 20. This outer cylinder also has a tail portion 22'' slightly narrower than its main or barrel portion. The tampon further includes an inner cylinder 23 having a flared front end 24 to prevent disengagement of the cylinders (see Fig. 4). When this tampon is used, the inner cylinder 23 is slid as in the case of the tampon shown in Figs. 1 and the absorbent pad 20 is pushed out and inserted into the body.

In the tampon of this type, by rounding the front end of the outer cylinder, the discomfort felt on insertion of the outer cylinder into the

body is reduced and the falling-out preventing effect is enhanced. However, the problem of large bulk is left unsolved.

We have carried out research with a view to solving the foregoing problems involved in the conventional tampons of the applicator type, and as a result, we have now completed the present invention.

In accordance with the invention we provide a sanitary tampon comprising an inner elongated housing open at the front and rear containing a pad of compressed absorbent material prevented from expanding by the wall of the inner housing, an outer elongated housing open at both ends surrounding the inner housing and at least partially withdrawable from the rear end thereof, the outer housing including one or more internal projections for engaging the pad and ensuring that it remains within the outer housing as the inner housing is withdrawn, the inner housing then being slidable back into the outer housing to abut the expanded pad to discharge the pad from the front end of the outer housing. The housings and pad are all preferably cylindrical.

We further provide a sanitary tampon for menstrual discharges comprising an applicator including an outer cylinder shaped for insertion into the body from a front end thereof, an inner cylinder within the outer cylinder and extending to the vicinity of the front end of the outer cylinder and slidably withdrawable therefrom, and an absorbent pad in the inner cylinder, the inner cylinder having at least one longitudinal slot extending back from its front end for a distance slightly greater than the length of the absorbent pad, a projection slidably engaged within the or each slot being formed on the inside of the outer cylinder at a distance from its front end slightly greater than the length of the absorbent pad, so that each projection extends through the slot into the inner cylinder to prevent withdrawal of the absorbent material from the rear end of the inner cylinder.

In the tampon of the present invention having the abovementioned structure, since the absorbent pad is contained in the inner cylinder and this inner cylinder is contained in the outer cylinder, the length of the applicator is only slightly greater than the length of the absorbent pad and the size of the applicator is much diminished. Furthermore, when the tampon is actually used, if the inner cylinder is withdrawn, the absorbent pad material is anchored by the projections and remains in the outer cylinder. As the compressed pad is no longer being restrained by the wall of the inner cylinder, it expands until restrained by the wall of the outer cylinder, so that when the inner cylinder is slid back into the outer cylinder, the absorbent material is pushed out very smoothly by the inner cylinder.

Preferably, the tampon has at least one

further longitudinal slot, which slot has closed ends, is formed on the inner cylinder and extends from a point spaced from the front end of the inner cylinder for a distance slightly exceeding the length of the absorbent material. A further projection slidably engaged within the or each further slot being formed on the inner wall of the outer cylinder at such a position that the distance of the or each further projection from the front end of the cylinder is slightly larger than the length of the absorbent pad, so that if the inner cylinder is withdrawn from the outer cylinder, it eventually comes into contact with the end of the further slot to prevent further withdrawal of the inner cylinder.

More preferably, the inner diameter of the rear end of the outer cylinder is smaller than the inner diameter of the portion of the outer cylinder within which the pad is housed, the outer diameter of the front portion of the inner cylinder is larger than the outer diameter of the rear portion of the inner cylinder, and when the inner cylinder is uniformly compressed in the circumferential direction, the outer diameter of the thickest portion of the inner cylinder is larger than the inner diameter of the rear end of said outer cylinder.

Embodiments of the invention are described below by way of example and with reference to the accompanying drawings, in which:

Figure 1 is a longitudinally sectional view showing a conventional tampon including a paper applicator.

Figure 2 is an enlarged view showing the cylinder connection portion in the tampon shown in Fig. 1.

Figure 3 is a longitudinally sectional view showing a conventional tampon including a plastic applicator.

Figure 4 is an enlarged view showing the cylinder connection portion in the tampon shown in Fig. 3.

Figure 5 is a longitudinally sectional view showing an outer cylinder of an applicator that is used in the present invention.

Figure 6 is an end view of the outer cylinder shown in Fig. 5.

Figure 7 is a side view of an inner cylinder of the applicator that is used in the present invention.

Figure 8 is a view showing the section taken along the line X-X' in Fig. 7.

Figure 9 is a view showing the section taken along the line Y-Y' in Fig. 7.

Figure 10 is a perspective view showing the inner cylinder.

Figure 11 is a longitudinally sectional view showing the applicator of the present invention.

Figure 12 is a longitudinally sectional view showing the state of the tampon of the present invention before use.

Figure 13 is a longitudinally sectional view showing the state of the tampon of the present

ent invention just before insertion into the body.

Figure 14 is a longitudinally sectional view showing the state of the tampon of the present invention after insertion.

Figure 15 is a longitudinally sectional view illustrating one example of the outer cylinder of the applicator that is used in the present invention.

Figure 16 is a view showing the section taken along the line A-A' in Fig. 15.

Figure 17 is a longitudinally sectional view illustrating one example of the inner cylinder of the applicator that is used in the present invention.

Figure 18 is a view showing the section taken along the line B-B' in Fig. 17.

Figure 19 is a longitudinally sectional view showing another example of the inner cylinder of the applicator that is used in the present invention.

Figure 20 is a longitudinally sectional view illustrating the state of the tampon of the present invention before use.

Figure 21 is a longitudinally sectional view illustrating the state of the tampon of the present invention just before insertion into the body.

Figure 22 is a longitudinally sectional view showing the state of the tampon of the present invention after insertion.

The inserting applicator comprises an outer cylinder as shown in Figs. 5 and 6 and an inner cylinder as shown in Figs. 7 to 10.

Referring to Fig. 5, an outer cylinder 25 includes projections 28 and 29 formed on its inner wall and spaced from the front end 26 by distances *a* and *b*, respectively. The distance *a* is slightly larger than the length of a compressed pad of absorbent material 20 incorporated into the tampon and the distance *b* is slightly larger than the distance *a*. An end elevation as seen from the rear end 27 of the outer cylinder 25 is shown in Fig. 6.

Referring to Fig. 7, an inner cylinder 30 includes an open-ended slot 11 slightly longer than distance *a* and slightly wider than the projection 28 and a closed-ended slot 12 extending from a point slightly spaced from the front end of the inner cylinder to a point slightly beyond the position of the projection 29 of the outer cylinder 29 and slightly wider than the projection 29.

Sections taken along the lines X-X' and Y-Y' in Fig. 7 are shown in Figs. 8 and 9 respectively.

Referring to Figs. 8 and 9, reference numeral 31 represents the front end portion of the inner cylinder wall located forwardly of the notch 12, and the length of the front end portion 31 is smaller than (*a-b*). The slip-preventing flange 32 is disposed to prevent the inner cylinder 30 from advancing into the outer cylinder 25 beyond this flange 32. The shape of this flange is not particularly critical.

Fig. 10 is a perspective view illustrating the inner cylinder 30, and Fig. 11 shows the two cylinders 25 and 30 assembled together. In this state, the projections 28 and 29 are fitted in the notches 11 and 12, respectively.

Fig. 12 is a view illustrating the tampon of the present invention before use. Before use, the compressed pad of absorbent material 20 is contained in the inner cylinder 30 and this inner cylinder 30 is housed within the outer cylinder 25, so that falling-out of the absorbent material and inner cylinder from the outer cylinder can be completely prevented. The tampon of the present invention is different from the conventional tampons in that the absorbent pad is packed in the inner cylinder. Further, the inner cylinder 30 is prevented from advancing in the outer cylinder 25 beyond the front end of the outer cylinder 25 by the tail portion 31 of the inner cylinder 30 and the projection 29, even if an attempt is made to withdraw the inner cylinder from the outer cylinder backwards.

Fig. 13 is a view showing the state of the tampon of the present invention just before insertion. In this state, the inner cylinder 30 has been withdrawn backwards until it has come to rest at the predetermined position. At this point, the absorbent pad 20 is retained in the outer cylinder 25 by means of the projection 25. The pad expands slightly as it is freed from the restraint imposed by the inner cylinder. The user now inserts the outer cylinder 25 into the body, and as shown in Fig. 14, the inner cylinder 30 is slid forward to push the expanded absorbent material into the body and complete the insertion.

As in the case of the conventional tampons, the applicator that is used in the tampon of the present invention may for example be of a plastics material, paper or the like.

In the manufacture of the conventional tampons, the absorbent pad can only be packed from the front end. In the manufacture of tampons of the present invention, the absorbent pad may be inserted from either the front end or from the tail portion.

The tampon of the present invention can easily be inserted hygienically and does not suffer from the problem of insufficient connection between the outer and inner cylinders. Moreover, in the tampon of the present invention, the size of the applicator can be remarkably diminished and need only be about half of the size of the applicator in the conventional tampons.

Further embodiments of the invention are illustrated in Figs. 15 to 22.

Fig. 15 is a longitudinal section showing one form of the outer cylinder of the applicator constituting the tampon of the present invention. Fig. 16 is a cross-section on the line A-A' in Fig. 15.

Fig. 17 is a longitudinal section showing an example of the inner cylinder of the applicator

according to the present invention. Fig. 18 is a cross-section on the line B-B' in Fig. 17.

Fig. 19 is a longitudinal section showing another example of the inner cylinder of the applicator according to the present invention. Figs. 20, 21 and 22 illustrate the relationship between the inner and outer cylinders and the absorbent pad in a tampon according to the present invention. More specifically, Fig. 20 is a longitudinal section illustrating the tampon before use, Fig. 21 is a longitudinal section illustrating the tampon just before insertion of the absorbent pad and Fig. 22 is a longitudinal section illustrating the tampon during insertion of the absorbent pad into vagina.

In this applicator the outer cylinder 108 has a substantially cylindrical shape as shown in Figs. 15 and 16, and an appropriate number of projections 109 are formed on its inner wall and they are spaced from the top end of the cylinder at a distance equal to or slightly longer than the piece of absorbent pad 114. Furthermore, the inside diameter of the opening 110 at the rear end of the outer cylinder 108 is made smaller than the inside diameter of the main or barrel portion of this cylinder by curving the rear end of the outer cylinder 108 inwardly or forming a shoulder on it.

As shown in Figs. 17 to 19, in the inner cylinder 111 of the applicator according to the present invention, the outer diameter of the front portion is made larger than the outer diameter of the rear portion, and slots 113 are formed on the inner cylinder 111. The number of these slots 113 is the same as the number of the projections formed on the outer cylinder 108. The length of the slots 113 is made larger than the length of the absorbent pad 114 and the width of the notches 113 is made slightly larger than the width of the projections 109. Furthermore, the inner cylinder 111 is formed so that when the inner cylinder 111 is uniformly compressed, the outer diameter of the thickest portion of the inner cylinder 111 is larger than the inner diameter of the rear end of the outer cylinder 108. In this inner cylinder 111, it is preferred that the front end portion 115 is curved as shown in Fig. 19. In this case, the absorbent pad can be pushed out very easily.

In the tampon according to the present invention, before use, the inner cylinder 111 is inserted in the outer cylinder 108 so that the projections 109 of the outer cylinder 108 fit into the corresponding slots 113 of the inner cylinder 111 as shown in Fig. 20, and the absorbent material 114 is contained in this cylinder 111. When the tampon is used, the inner cylinder 111 is partly withdrawn from the outer cylinder 108. When the front end of the inner cylinder 111 reaches the projections 109 (see Fig. 21), the outer cylinder 108 is inserted in the vagina and then the inner cylinder 111 is pushed back into the

outer cylinder. Thus, the absorbent pad 114, which has expanded slightly, is pushed out from the front end of the applicator (see Fig. 22) and insertion of the tampon into the body is completed.

When the inner cylinder 21 is partly withdrawn from the outer cylinder 108, movement of the absorbent material 114 with the inner cylinder 111 is prevented by the projections 109 formed on the outer cylinder 108, and separation of the inner cylinder 111 from the outer cylinder 108 is prevented by changing the outer diameter of the inner cylinder between the front portion and the rear portion and sliding of the inner cylinder is facilitated by forming the notches 113 on the inner cylinder. Furthermore, if the open front end of the slot of the inner cylinder is narrowed as shown in Fig. 19, pushing out of the absorbent material is facilitated.

The tampon of the present invention can easily be prepared by inserting the inner cylinder from the front end of the outer cylinder, inserting the absorbent material into the inner cylinder and, if desired, forming curved portions on the front ends of the inner and outer cylinders.

The thus-prepared tampon of the present invention can be kept in good sanitary condition before use (see Fig. 20), and falling-out of the inner cylinder from the outer cylinder is prevented whilst it is being carried. Furthermore, the size of the tampon is only about 1.5 times the size of the absorbent material, i.e. only about $\frac{1}{2}$ of the size of conventional tampons. Accordingly, the disadvantage of some conventional tampons of the applicator type, i.e., the disadvantage that the bulk is increased although comfort in use is improved, can be substantially eliminated in the tampon of the present invention.

CLAIMS

1. A sanitary tampon for menstrual discharges comprising an applicator including an outer cylinder shaped for insertion into the body from a front end thereof, an inner cylinder within the outer cylinder and extending to the vicinity of the front end of the outer cylinder and slidably withdrawable therefrom, and an absorbent pad in the inner cylinder, the inner cylinder having at least one longitudinal slot extending back from its front end for a distance slightly greater than the length of the absorbent pad, a projection slidably engaged within the or each slot being formed on the inside of the outer cylinder at a distance from its front end slightly greater than the length of the absorbent pad, so that each projection extends through the slot into the inner cylinder to prevent withdrawal of the absorbent material from the rear end of the inner cylinder.

2. A sanitary tampon according to Claim 1 wherein at least one further longitudinal slot,

which slot has closed ends, is formed on the inner cylinder and extends from a point spaced from the front end of the inner cylinder for a distance slightly exceeding the

- 5 length of the absorbent material, a further projection slidably engaged within the or each further slot being formed on the inner wall of the outer cylinder at such a position that the distance of the or each further projection from
10 the front end of the cylinder is slightly larger than the length of the absorbent pad, so that if the inner cylinder is withdrawn from the outer cylinder, it eventually comes into contact with the end of the further slot to prevent
15 further withdrawal of the inner cylinder.

3. A sanitary tampon according to either preceding claim, wherein the inner diameter of the rear end of the outer cylinder is smaller than the inner diameter of the portion of the
20 outer cylinder within which the pad is housed, the outer diameter of the front portion of the inner cylinder is larger than the outer diameter of the rear portion of the inner cylinder, and when the inner cylinder is uniformly compressed in the circumferential direction, the
25 outer diameter of the thickest portion of the inner cylinder is larger than the inner diameter of the rear end of said outer cylinder.

4. A sanitary tampon according to any preceding claim wherein the top end of the
30 inner cylinder is inwardly tapered.

5. A sanitary tampon comprising an inner elongated housing open at the front end and containing a pad of compressed absorbent
35 material prevented from expanding by the wall of the inner housing, an outer elongated housing open at both ends surrounding the inner housing and at least partially withdrawable from the rear end thereof, the outer housing including one or more internal projections
40 for engaging the pad and ensuring that it remains within the outer housing as the inner housing is withdrawn, the inner housing then being slidable back into the outer housing to
45 abut the expanded pad to discharge the pad from the front end of the outer housing.